



**COMMISSION
THIRTEENTH REGULAR SESSION**

Denarau Island, Fiji
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**REFERENCE DOCUMENT FOR REVIEW OF CMM 2015-04
(Pacific Bluefin Tuna)**

**WCPFC13-2016-19
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Paper prepared by the Secretariat

A. Introduction

1. The purpose of this paper is to provide a quick reference guide to the recommendations of the Scientific Committee (SC) and the Technical and Compliance Committee (TCC) of relevance to the discussions in support of the review of the CMM to establish multi-annual rebuilding plan or Pacific bluefin tuna (CMM 2015-04). It lists the recommendations drawn from the summary report of SC12. The Summary Report is part of the meeting documentation and readily available for access and they provide the context and discussion in support of the recommendations.

B. Scientific Committee Recommendations

Pacific bluefin tuna (*Thunnus orientalis*)

Stock status and trends (SC12 Paras 393-396)

2. SC12 noted that ISC provided the following conclusions on the stock status of Pacific bluefin tuna (PBF) in the Pacific Ocean in 2016 (SC12-SA-WP-07: *2016 Pacific Bluefin Tuna Stock Assessment*):
- a) The PBF working group conducted a benchmark assessment (base-case model) using the best available fisheries and biological information, and the 2016 base-case model is a substantial improvement compared to the 2014 assessment and fits all reliable data well. The base-case model indicates: (1) spawning stock biomass (SSB) fluctuated throughout the assessment period (fishing years 1952-2014) and (2) the SSB steadily declined from 1996 to 2010; and (3) the decline appears to have ceased since 2010, although the stock remains near the historic low.
 - b) Using the base-case model, the 2014 (terminal year) SSB was estimated to be around 17,000 mt. Recruitment estimates fluctuate widely without an apparent trend. The 2014 recruitment was relatively low, and the average recruitment for the last five years may have been below the historical average level (Figure 1).

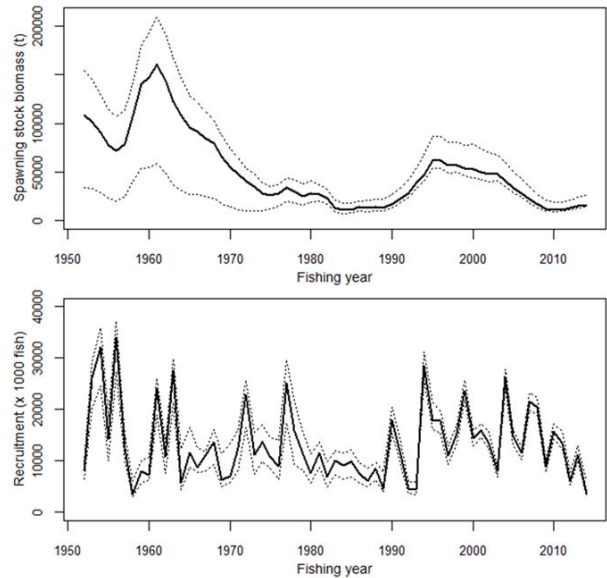


Figure 1. SSB (top) and recruitment (bottom) of PBF from the base-case model. The solid line indicates point estimate and dashed lines indicate the 90% confidence interval.

- c) Although no limit reference points have been established for the PBF stock under the auspices of the WCPFC and IATTC, the $F_{2011-2013}$ exceeds all calculated biological reference points except for F_{MED} and F_{LOSS} ¹ despite slight reductions to F in recent years (Table 1). The ratio of SSB in 2014 relative to the theoretical unfished² SSB ($SSB_{2014}/SSB_{F=0}$, the depletion ratio) is 2.6%³. Note that potential effects on F s as a result of the measures of the WCPFC and IATTC starting in 2015 or by other voluntary measures are not yet reflected in the data used in this assessment.

Table 1. Ratios of the estimated fishing mortalities $F_{2002-2004}$, $F_{2009-2011}$ and $F_{2011-2013}$ relative to computed F -based biological reference points and SSB (t) and depletion ratio for the terminal year of the reference period for PBF.

	F_{max}	$F_{0.1}$	F_{med}	F_{loss}	$F_{10\%}$	$F_{20\%}$	$F_{30\%}$	$F_{40\%}$	Estimated SSB for terminal year of each reference period	Depletion ratio for terminal year of each reference period
2002-2004	1.86	2.59	1.09	0.80	1.31	1.89	2.54	3.34	41,069	0.064
2009-2011	1.99	2.78	1.17	0.85	1.41	2.03	2.72	3.58	11,860	0.018
2011-2013	1.63	2.28	0.96	0.70	1.15	1.66	2.23	2.94	15,703	0.024

- d) Since reference points for PBF have yet to be identified, two examples of Kobe plots (Figure 2: plot A based on SSB_{MED} and F_{MED} , plot B based on $SSB_{20\%}$ and $SPR_{20\%}$) are presented. These versions of the Kobe plot represent two interpretations of stock status in an effort to prompt further discussion. In summary, if these were the reference points, overfishing would be occurring or just at the threshold in the case of F_{MED} ; and the stock would be considered

¹ F_{LOSS} is the F which produces spawning biomass per recruit at the historically lowest observed spawning stock biomass (S_{LOSS}) given the expected level of recruitment (R_{LOSS}) at S_{LOSS} . Hence, F_{LOSS} is an easy concept to understand as a limit reference point for avoiding recruitment overfishing.

² “Unfished” refers to what SSB would be had there been no fishing.

³ The unfished SSB is estimated based upon equilibrium assumptions of no environmental or density-dependent effects.

overfished. Plot B shows that the stock has remained in an overfished and overfishing status for the vast majority of the assessment period if $F_{20\%}$ and $SSB_{20\%}$ are the reference points.

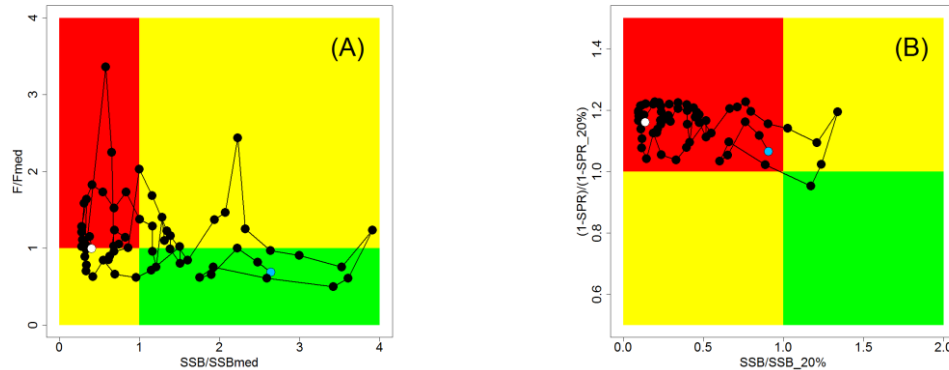


Figure 2. Kobe plots for PBF. (A) SSB_{MED} and F_{MED} ; (B) $SSB_{20\%}$ and $SPR_{20\%}$ based. Note that SSB_{MED} is estimated as the median of estimated SSB over whole assessment period (40,944 t) and F_{MED} is calculated as an F to provide SSB_{MED} in long-term, while the plots are points of estimates. The blue and white points on the plot show the start (1952) and end (2014) year of the period modelled in the stock assessment, respectively.

- e) Historically, the WPO coastal fisheries group has had the greatest impact on the PBF stock, but since about the early 1990s the WPO purse seine fleets, in particular those targeting small fish⁴ (age 0-1), have had a greater impact, and the effect of these fleets in 2014 was greater than any of the other fishery groups. This is because the impact of a fishery on a stock depends on both the number and size of the fish caught by each fleet; i.e., catching a high number of smaller juvenile fish can have a greater impact on future SSB than catching the same weight of larger mature fish.

3. In the absence of any agreed definition of a drastic drop in stock recruitment referred to in CMM 2015-04, SC12 notes with concern that the 2012 and 2014 recruitments are at the lowest levels observed since 1980, noting that ISC noted that recruitment in the terminal years of any assessment is highly uncertain. SC12 also noted a comment from Japan that some indices of 2015 recruitment are above the 2014 level and early anecdotal information regarding the 2016 recruitment suggests it is not particularly low.

4. The provisional total PBF catch in 2015 was 11,020 mt in the North Pacific Ocean, which was a 36% decrease over 2014 and a 30% decrease over the average for 2010-2014.

5. SC12 noted that, based on the latest stock assessment carried out by ISC in 2016, the PBF SSB is depleted to 2.6% of the estimated unfished SSB ($SBF=0$). SC12 emphasized that this depletion level is considerably below the biomass depletion-based limit reference point of 20% of $SBF=0$ set by the Commission for all other WCPFC key tuna stocks (skipjack, yellowfin, bigeye, south Pacific albacore and north Pacific albacore). However, SC12 also notes that the PBF stock remained below 20% of $SBF=0$ for most of the time of assessment. SC12 also noted that the initial rebuilding target currently defined by the CMM 2015-04, the median of the SSB of the stock assessment period (42,582 mt) corresponds to a spawning biomass of around 7% of estimated unfished SSB.

⁴ It was noted that the term small fish is not used in CMM 2015-04; however, the measure states “Further substantial reductions in fishing mortality and juvenile catch over the whole range of juvenile ages should be considered...”

Management advice and implications (SC12 Paras 397-399)

6. SC12 noted the following conservation advice from ISC:
 - a) The projection results based on the base-case model under several harvest and recruitment scenarios and time schedules showed that the initial goal of WCPFC, rebuilding to SSB_{MED} by 2024 with at least 60% probability, is reached and the risk of SSB falling below SSB_{LOSS} at least once in 10 years was low.
 - b) The projection results based on the base-case model under several harvest and recruitment scenarios and time schedules indicate that:
 - (1) the probability of SSB recovering to the initial WCPFC target ($SSB_{MED, 1952-2014}$) is 69% or above the level prescribed in the WCPFC CMM if low recruitment scenario is assumed and WCPFC CMM 2015-04 and IATTC Resolution C-14-06 continue in force and are fully implemented.
 - (2) a 10% reduction in the catch limit for fish smaller than the weight threshold in CMM 2015-04 would have a larger effect on recovery than a 10% reduction in the catch limit for fish larger than the weight threshold.
 - c) The ISC therefore recommends defining SSB_{MED} as the median point estimate for a fixed period of time, either, 1952-2012 or 1952-2014. If 1952-2012 is chosen, then SSB_{MED} is estimated to be 41,069 mt, and if 1952-2014 is chosen, SSB_{MED} is 40,994 mt. The ISC recommends that in the future absolute values should not be used for the initial rebuilding target, as the calculated values of reference points would change from assessment to assessment.

7. SC12 advised WCPFC13 that FFA members expressed concern that the substantial depletion of the Pacific bluefin stock due to excess fishing in the northern WCPFC region has probably resulted in range contraction, thus greatly reducing the availability of bluefin tuna (*Thunnus orientalis*) in the south Pacific. This is of particular significance to Pacific island CCMs because it limits their future opportunities for the participation in fisheries for this stock. SC12 also noted no statistical demonstration is provided to support the range contraction of PBF. SC12 noted the need for additional information.

8. In view of the upcoming IATTC-WCPFC joint meeting on PBF management, SC12 expressed the need of urgent coordinated actions between WCPFC and IATTC in reviewing the current rebuilding plan, establishing the emergency rule as well as considering and developing reference points and HCRs for the long term management of PBF.